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DERWENT-ACC-NO: 1995-079379

DERWENT-WEEK: 199511

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TITLE: LED light emission unit for dot matrix
type indicators - includes connecting electrodes of chip
and electric conduction surfaces with conductive
adhesive agents while chip placed in recess in reflector

PATENT-ASSIGNEE: STANLEY ELECTRIC CO LTD[SNLE]

PRIORITY-DATA: 1993JP-0167324 (June 15, 1993)

PATENT-FAMILY:

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APPLICATION-DATA:

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INT-CL (IPC): H01L033/00

ABSTRACTED-PUB-NO: JP 07007185A

BASIC-ABSTRACT:

The LED light emission unit (1) consists of a reflector (2) which has a recess (2a) and two reflection electrical conductive surfaces (2b, 2c) which are P-type and N-type. A chip (3) is press fitted into the opening in the reflector. The junction (3a) of the chip is perpendicular to the base of the reflector. The chip has two electrodes (3b, 3c) with

positive and negative
polarities corresponding to the P and N type reflector
surfaces respectively.
The chip is mounted in the recess and fixed by using white
insulating adhesive
agent (4). The electrodes of the chip are connected to their
corresponding
conductive reflector surfaces with the help of conductive
adhesive agents (5).

ADVANTAGE - Prevents need for difficult skilful process like
bonding with wires
for electric connection. Improves productivity and
performance. Eliminates
isometric view phenomena. Provides exact positioning of chip
and reflector.

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: LED LIGHT EMIT UNIT DOT MATRIX TYPE INDICATE
CONNECT ELECTRODE

CHIP ELECTRIC CONDUCTING SURFACE CONDUCTING
ADHESIVE AGENT CHIP
PLACE RECESS REFLECT

DERWENT-CLASS: U12

EPI-CODES: U12-A01A4;

SECONDARY-ACC-NO:

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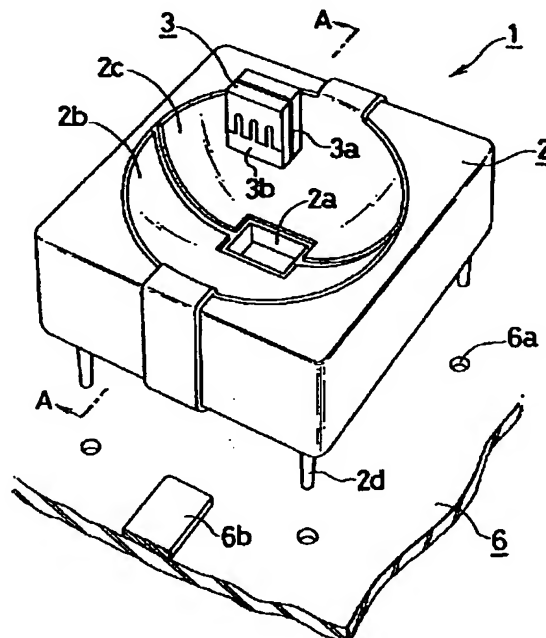
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(54) 【発明の名称】 LED発光ユニット

(57) 【要約】 (修正有)

【目的】 LEDチップの電氣的接続にワイヤボンダなど熟練と手間とを必要とする困難な工程を廃し生産性の向上を図る。

【構成】 本発明により、リフレクタ2には底面にジャンクション3aを鉛直方向としたLEDチップ3に略嵌合する凹部2aが設けられると共に、リフレクタ2面にはLEDチップ3の正負夫々の電極3b、3cに対応する夫々の導電部2b、2cを反射面を兼ねるようにして敷設し、凹部2aに白色の絶縁性接着剤4でマウントしたLEDチップ3の夫々の電極3b、3cと夫々の導電部2b、2cとを導電性接着剤5で接着して電氣的結線が行われているLED発光ユニット1としたことで、LEDチップ3の電氣的接続にワイヤボンダなど熟練と手間とを必要とする困難な工程を廃する。



【特許請求の範囲】

【請求項1】 絶縁性部材で形成されたリフレクタの底面にLEDチップがマウントされ電気的結線が行われて成るLED発光ユニットにおいて、前記リフレクタは底面にジャンクションを鉛直方向とした前記LEDチップの外形に略嵌合する凹部が設けられると共に、リフレクタ面には前記LEDチップの正負夫々の電極に対応する正負夫々の導電部を反射面を兼ねるようにして敷設し、前記凹部に白色の絶縁性接着剤でマウントした前記LEDチップの夫々の電極と夫々の前記導電部とを導電性接着剤で接着して電気的結線が行われていることを特徴とするLED発光ユニット。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、例えばドットマトリクス式の表示器の構成エレメントであるLED発光ユニットに関するものであり、詳細には前記LED発光ユニットの構成に係るものである。

【0002】

【従来の技術】従来のこの種のLED発光ユニット90の構成の例を示すものが図5であり、このLED発光ユニット90は、N極配線91aとP極配線91bとが敷設されたプリント基板91と、LEDチップ92と、リフレクタ93とから成り、LED発光ユニット90を組立てる際には、先ずプリント基板91のN極配線91a上にN層電極92a側で接するようにしてLEDチップ92が導電性接着剤94などでマウントされる。

【0003】次いで、リフレクタ93とプリント基板91が例えばボス93aと取付孔91cとにより取付けられ、前記LEDチップ92のP層電極92bとプリント基板91のP極配線91bとの接続が行われるものとなるが、このときにP極側の接続はリフレクタ93を越えて行わなければならないものとなるので、前記リフレクタ93には中継配線93bが設けられ、この中継配線93bを介してワイヤボンダ95、ワイヤボンダ96の二箇所で行われるものと成っている。

【0004】

【発明が解決しようとする課題】しかしながら、前記した従来のLED発光ユニット90の構成においては、第一には、ワイヤボンダ95、ワイヤボンダ96の二箇所での接続が必要となり作業工数が増加し生産性が低下する問題点を生じるものとなり、また第二には、LEDチップ92とリフレクタ93とがプリント基板91を介して位置決めが行われるものであるので、相互の位置ズレを生じ易く、例えば照射方向が斜めとなるなど性能上の問題も生じるものとなり、これらの点の解決が課題とされるものとなっていた。

【0005】

【課題を解決するための手段】本発明は前記した従来の課題を解決するための具体的な手段として、絶縁性部材

で形成されたリフレクタの底面にLEDチップがマウントされ電気的結線が行われて成るLED発光ユニットにおいて、前記リフレクタは底面にジャンクションを鉛直方向とした前記LEDチップの外形に略嵌合する凹部が設けられると共に、リフレクタ面には前記LEDチップの正負夫々の電極に対応する正負夫々の導電部を反射面を兼ねるようにして敷設し、前記凹部に白色の絶縁性接着剤でマウントした前記LEDチップの夫々の電極と夫々の前記導電部とを導電性接着剤で接着して電気的結線が行われていることを特徴とするLED発光ユニットを提供することで、生産性を向上させ且つ性能の向上も可能として課題を解決するものである。

【0006】

【実施例】つぎに、本発明を図に示す一実施例に基づいて詳細に説明する。図1及び図2に符号1で示すものは本発明に係るLED発光ユニットであり、このLED発光ユニット1もリフレクタ2の底面にLEDチップ3がマウントされ、且つこのLEDチップ3にはプリント基板6からの電気的結線が行われている点は従来例のものと同様である。

【0007】ここで、本発明では前記リフレクタ2の底面に凹部2aを形成するものであり、このときに、前記凹部2aはジャンクション3aを鉛直、即ち、リフレクタ2の光軸と平行とした状態のLEDチップ3の底面外形が僅かな余裕をもって嵌合する寸法として形成されるものとなる。

【0008】また、前記リフレクタ2のリフレクタ面にはLEDチップ3のP層電極3bに対応してはP極導電部2b、N層電極3cに対応してはN極導電部2cが設けられるものとされ、このP極導電部2b及びN極導電部2cは例えばアルミ蒸着など鏡面のものとされて反射面を兼ねるものとされている。また、同時にP極導電部2b及びN極導電部2cは夫々がリフレクタ2の側面に回込み底面まで達するものとされて、後に説明するプリント基板6との接続に備えるものとされている。

【0009】ここで、前記リフレクタ2とLEDチップ3とのマウントに就いて説明を行えば、このマウントを行う際には、先ず、前記凹部2aには例えばエポキシ樹脂に酸化チタンの微粉末を混和して形成した白色の絶縁性接着剤4の適量を注入し、その後にLEDチップ3の嵌入を行うと、図3に示すように前記絶縁性接着剤4は凹部2aとLEDチップ3との間隙を充填するものとなる。

【0010】ここで、前記絶縁性接着剤4を白色とするのは前記LEDチップ3が全面で発光を行うからであり、前記絶縁性接着剤4を白色とすることで、この接着が行われた面での発光を照射方向に反射させるものとなり、光量の損失を最低限のものとすることが可能となる。

【0011】この状態で前記絶縁性接着剤4を硬化させ

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ればLEDチップ3のリフレクタ2へのマウントは完了したものである。その後、図4に示すように前記LEDチップ3のP層電極3bとP極導電部2b、及び、N層電極3cとN極導電部2cとを銀ペーストなどと称されている導電性接着剤5で接着すれば、リフレクタ2とLEDチップ3との電気的な接続が行われるものとなる。

【0012】続いて、LEDチップ3がマウントされたリフレクタ2はプリント基板6に取付けられるものとされるが、このときには従来例で説明したのと同様に、リフレクタ2側に設けられたボス2dとプリント基板6側に設けられた取付孔6aとを嵌着することで行われる。

【0013】このときに、前記リフレクタ2の側においてはP極導電部2b及びN極導電部2cが底面まで達するものとされていることで、プリント基板6上に敷設されるP極配線6b及びN極配線6cを適宜位置としておくことで、前記したリフレクタ2とプリント基板6の取付時に、P極導電部2bとP極配線6b及びN極導電部2cとN極配線6cも同時に夫々が接触し接続されるものとなる。

【0014】尚、このときにP極導電部2bとP極配線6bなど接続が行われる相互間を、上記P層電極3bとP極導電部2bとの間で行われたように導電性接着剤5で接着し一層に確実性を増すものとするなどの追加工程を加えることは自在であり、この場合においても所定位置に単に塗布することで目的を達するものとなるので、作業性などに特別に困難な状態を生じることはない。

【0015】次いで、上記の構成とした本発明のLED発光ユニット1の作用及び効果について説明を行う。先ず、組立工程においてはリフレクタ2とLEDチップ3の間が接着、リフレクタ2とプリント基板の間が接触と言う簡便な手段により接続が行われるものとなり、高度の熟練を要するワイヤーボンドの二箇所が不要となり、生産性の向上を可能とするものとなる。

【0016】また、上記の説明でも明らかなように、リフレクタ2とLEDチップ3との取付工程がプリント基板6を必要とすることなく行えるものとなったので、この両者3、3の取付工程を予め先行させることも可能となり、生産ラインが簡素化し、この点からも生産性の向上を可能とするものとなる。

【0017】また、性能面では凹部2aによりLEDチップ3がリフレクタ2に対する位置を正確に設定されるものと成ったことで、例えば取付工程での誤差による照射方向の斜視現象などは生じることのないものとなり、

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常に正しい照射方向が得られるものとして、各LED発光ユニット1間にバラツキを生じないものとする。

【0018】

【発明の効果】以上に説明したように本発明により、リフレクタには底面にジャンクションを鉛直方向としたLEDチップの底面外形に略嵌合する凹部が設けられると共に、リフレクタ面には前記LEDチップの正負夫々の電極に対応する正負夫々の導電部を反射面を兼ねるようにして敷設し、前記凹部に白色の絶縁性接着剤でマウントした前記LEDチップの夫々の電極と夫々の前記導電部とを導電性接着剤で接着して電気的結線が行われているLED発光ユニットとしたことで、先ず、生産工程の面では、LEDチップの電気的接続にワイヤボンドなど熟練と手間とを必要とする困難な工程を廃し生産性の向上に極めて優れた効果を奏するものであり、同時に前記凹部によりリフレクタとLEDチップとの相互位置を正確なものとして、例えば斜視現象などを生じないものとし、性能向上にも優れた効果を奏するものである。

【図面の簡単な説明】

【図1】 本発明に係るLED発光ユニットの一実施例を分解した状態で示す斜視図である。

【図2】 図1のA-A線に沿う断面図である。

【図3】 同じ実施例のLEDチップのリフレクタへのマウント工程を示す説明図である。

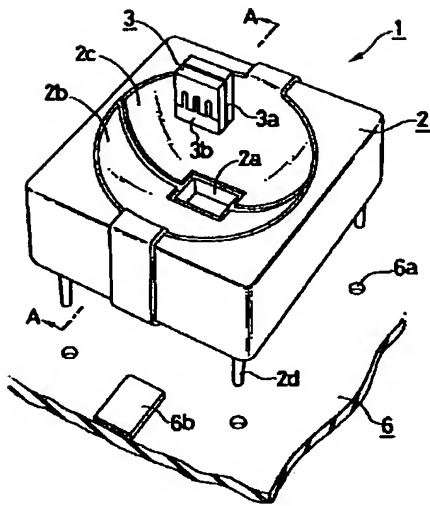
【図4】 同じ実施例のLEDチップのリフレクタとの電気的接続工程を示す説明図である。

【図5】 従来例を示す断面図である。

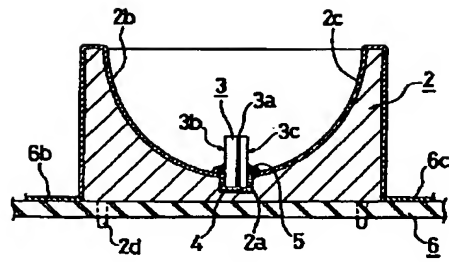
【符号の説明】

- 1.....LED発光ユニット
- 2.....リフレクタ
- 2a.....凹部
- 2b.....P極導電部
- 2c.....N極導電部
- 2d.....ボス
- 3.....LEDチップ
- 3a.....ジャンクション
- 3b.....P層電極
- 3c.....N層電極
- 4.....絶縁性接着剤
- 5.....導電性接着剤
- 6.....プリント基板
- 6a.....取付孔
- 6b.....P極配線
- 6c.....N極配線

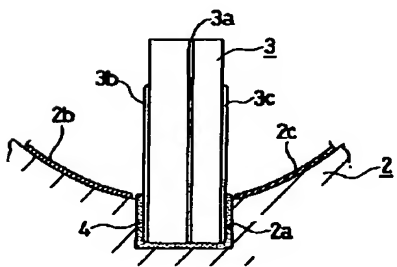
【図1】



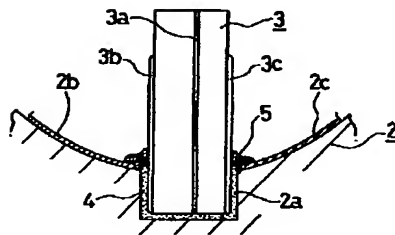
【図2】



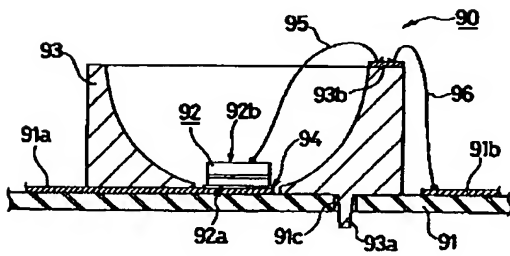
【図3】



【図4】



【図5】



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a detail at the configuration of said LED luminescence unit about the LED luminescence unit which is the configuration element of the drop of for example, a dot-matrix type.

[0002]

[Description of the Prior Art] It is drawing 5 which shows the example of the configuration of this conventional kind of LED luminescence unit 90. This LED luminescence unit 90 In case it consists of the printed circuit board 91 by which N pole wiring 91a and P pole wiring 91b were laid, the LED chip 92, and a reflector 93 and the LED luminescence unit 90 is assembled First, on N pole wiring 91a of a printed circuit board 91, as it touches by the N layer electrode 92a side, the LED chip 92 is mounted with electroconductive glue 94 etc.

[0003] Subsequently, although it becomes that to which a reflector 93 and a printed circuit board 91 are attached in by for example, boss 93a and mounting hole 91c, and connection between P layer electrode 92b of said LED chip 92 and P pole wiring 91b of a printed circuit board 91 is made Since it becomes what does not change if connection by the side of P pole is not made more than a reflector 93 at this time, junction wiring 93b is prepared in said reflector 93, and it changes with what is performed by two places, the wire bond 95 and the wire bond 96, through this junction wiring 93b.

[0004]

[Problem(s) to be Solved by the Invention] However, it sets in the above mentioned configuration of the conventional LED luminescence unit 90. It becomes what produces the trouble that connection by two places, the wire bond 95 and the wire bond 96, is needed in the first place, an activity man day increases to it, and productivity falls. To the second Since positioning is performed through a printed circuit board 91, the LED chip 92 and a reflector 93 tended to produce mutual location gap, for example, became what also produces a performance problem -- the direction of radiation becomes slanting -- and solution of these points had considered as the technical problem.

[0005]

[Means for Solving the Problem] In the LED luminescence unit which an LED chip is mounted on the base of the reflector formed by the insulating member as a concrete means for this invention to solve the above mentioned conventional technical problem, and electric connection is performed, and changes While the crevice which carries out abbreviation fitting is established in the appearance of said LED chip which made the junction the direction of a vertical on the base, said reflector In a reflector side, the current carrying part of each positive/negative corresponding to the electrode of each positive/negative of said LED chip is laid, as it serves as a reflector. By offering the LED luminescence unit characterized by pasting up each electrode and said each current carrying part of said LED chip mounted on said crevice with white insulating adhesives with electroconductive glue, and performing electric connection Productivity is raised and improvement in the engine performance also solves a technical problem as possible.

[0006]

[Example] Below, this invention is explained to a detail based on one example shown in drawing. It is the LED luminescence unit concerning this invention which is shown in drawing 1 and drawing 2 with a sign 1, and this LED luminescence unit 1 of the point that the LED chip 3 is mounted on the base of a reflector 2, and electric connection from a printed circuit board 6 is performed for this LED chip 3 is the same as that of the thing of the conventional example.

[0007] Here, in this invention, crevice 2a is formed in the base of said reflector 2, and said crevice 2a is formed as a dimension into which the base appearance of the LED chip 3 in the condition of having made junction 3a parallel to a vertical, i.e., the optical axis of a reflector 2, fits with slight allowances at this time.

[0008] Moreover, if it corresponds to the reflector side of said reflector 2 at P layer electrode 3b of the LED chip 3 and corresponds to P pole current-carrying-part 2b and N layer electrode 3c, it shall be prepared in N pole current-carrying-part 2c, and this P pole current-carrying-part 2b and N pole current-carrying-part 2c are having served as a reflector, for example, aluminum vacuum evaporation etc. being used as the thing of a mirror plane. Moreover, each shall be reached by coincidence to a time lump base on the side face of a reflector 2, and connection with the printed circuit board 6 explained later shall be equipped with P pole current-carrying-part 2b and N pole current-carrying-part 2c at it.

[0009] Here, if it explains about mounting with said reflector 2 and LED chip 3, and the optimum dose of the insulating adhesives 4 of the white which mixed with the impalpable powder of titanium oxide and formed it in the epoxy resin will be poured into said crevice 2a and the LED chip 3 will be first inserted after that in case this mounting is performed, as shown in drawing 3, said insulating adhesives 4 will be filled up with the gap of crevice 2a and the LED chip 3.

[0010] Said insulating adhesives 4 are made white because said LED chip 3 emits light on the whole surface, and it is making said insulating adhesives 4 white, and turns into what reflects in the direction of radiation luminescence in the field where this adhesion was performed here, and it becomes possible to make loss of the quantity of light into a minimum thing.

[0011] Since mounting to the reflector 2 of the LED chip 3 will become what was completed if said insulating adhesives 4 are stiffened in this condition If P layer electrode 3b of said LED chip 3, P pole current-carrying-part 2b, and N layer electrode 3c and N pole current-carrying-part 2c are pasted up with the electroconductive glue 5 called the silver paste etc. after that as shown in drawing 4, electric connection between a reflector 2 and the LED chip 3 will be made.

[0012] Then, the reflector 2 on which the LED chip 3 was mounted is performed by attaching boss 2d prepared in the reflector 2 side, and mounting hole 6a prepared in the printed circuit board 6 side, as the conventional example explained at this time, although attached at a printed circuit board 6.

[0013] It is that P pole current-carrying-part 2b and N pole current-carrying-part 2c shall be reached to a base at said reflector 2 side at this time. By what P pole wiring 6b and N pole wiring 6c which are laid on a printed circuit board 6 are suitably made into the location for, at the time of attachment of the above mentioned reflector 2 and the above mentioned printed circuit board 6, each contacts coincidence and P pole current-carrying-part 2b, P pole wiring 6b and N pole current-carrying-part 2c, and N pole wiring 6c are also connected to it.

[0014] In addition, the mutual to which connection, such as P pole current-carrying-part 2b and P pole wiring 6b, is made at this time It is free to add like the additional processing of pasting up with electroconductive glue 5, and it being further alike, and increasing certainty as carried out between the above-mentioned P layer electrode 3b and P pole current-carrying-part 2b. Also in this case, since it becomes what gives the purpose to a predetermined location by only applying, a difficult condition is not specially produced in workability etc.

[0015] Subsequently, the operation and effectiveness of the LED luminescence unit 1 of this invention which were considered as the above-mentioned configuration are explained. First, it sets like an erector, between a reflector 2 and the LED chips 3 becomes unnecessary [the wire bond with which between adhesion, a reflector 2, and printed circuit boards becomes that to which connection is made by the simple means called contact, and requires advanced skill] two places, and improvement in productivity

is enabled.

[0016] moreover, since it became what can be performed without needing a printed circuit board 6 like the shipfitter of a reflector 2 and the LED chip 3 so that clearly [the above-mentioned explanation], it becomes possible, a production line simplifies and it being alike like these both 3 and 3 shipfitter beforehand, and also making it precede enables improvement in productivity also from this point.

[0017] Moreover, in an engine-performance side, variation shall not be produced between each LED luminescence unit 1 as that from which the strabism phenomenon of the direction of radiation by the error like a shipfitter etc. becomes what is not produced, and the right direction of radiation is always obtained by having changed with that to which the LED chip 3 is correctly set by crevice 2a in the location to a reflector 2.

[0018]

[Effect of the Invention] As explained above, while the crevice which carries out abbreviation fitting by this invention at the base appearance of the LED chip which made the junction the direction of a vertical on the base at the reflector is prepared In a reflector side, the current carrying part of each positive/negative corresponding to the electrode of each positive/negative of said LED chip is laid, as it serves as a reflector. By having considered as the LED luminescence unit to which each electrode and said each current carrying part of said LED chip mounted on said crevice with white insulating adhesives are pasted up with electroconductive glue, and electric connection is performed First, it is what does so the effectiveness which abandoned the difficult process which needs skill, such as wire bond, and time and effort for the electrical installation of an LED chip in respect of the production process, and was extremely excellent in improvement in productivity. The effectiveness which should produce for example, a strabism phenomenon etc. as an exact thing in coincidence, and was excellent also in the improvement in the engine performance in the mutual location of a reflector and an LED chip with said crevice at it is done so.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view shown where one example of the LED luminescence unit concerning this invention is decomposed.

[Drawing 2] It is the sectional view which meets the A-A line of drawing 1 .

[Drawing 3] It is the explanatory view showing the mounting process to the reflector of the LED chip of the same example.

[Drawing 4] It is the explanatory view showing an electrical installation process with the reflector of the LED chip of the same example.

[Drawing 5] It is the sectional view showing the conventional example.

[Description of Notations]

- 1 LED luminescence unit
- 2 Reflector
- 2a Crevice
- 2b P pole current carrying part
- Two c....N pole current carrying part
- 2d Boss
- 3 LED chip
- 3a Junction
- Three b....P layer electrodes
- Three c....N layer electrodes
- 4 Insulating adhesives
- 5 Electroconductive glue
- 6 Printed circuit board
- 6a Mounting hole
- Six b....P pole wiring
- Six c....N pole wiring

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CLAIMS

[Claim(s)]

[Claim 1] In the LED luminescence unit which an LED chip is mounted on the base of the reflector formed by the insulating member, and electric connection is performed, and changes While the crevice which carries out abbreviation fitting is established in the appearance of said LED chip which made the junction the direction of a vertical on the base, said reflector In a reflector side, the current carrying part of each positive/negative corresponding to the electrode of each positive/negative of said LED chip is laid, as it serves as a reflector. The LED luminescence unit characterized by pasting up each electrode and said each current carrying part of said LED chip mounted on said crevice with white insulating adhesives with electroconductive glue, and performing electric connection.

[Translation done.]